REMARKS

The presently filed document is filed in response to the Examiner's communication mailed January 29, 2004, and Notice dated June 5, 2004. This document is identical to the originally-filed response filed May 26, 2004, via facsimile transmission to the Examiner's communication mailed January 29, 2004, with respect to Claims 19-31 and the Remarks below. However, the Notice dated June 5, 2004, indicated that the response filed May 26, 2004, failed to list all of the claims (e.g. claims 32-35) and failed to include the text of all the claims (e.g. claims 1-18). Applicants respectfully request the Office to accept this document as fully responsive to both the Examiner's communication mailed January 29, 2004, and the Notice dated June 5, 2004, since the present document now lists all of the claims (e.g. claims 32-35) and includes the text of all the claims (e.g. claims 1-18).

Claims 19-35 are in the application. Claims 1-18 have been withdrawn. No Claim stands allowed.

This application is an RCE application. The Examiner states that the rejections set forth in the final rejection mailed 5/7/03 have been maintained.

In the present communication, Claims 19-23 and 26-29 stand rejected under 35 USC §103(a) as being unpatentable over Huffman et al. in view of Pearson et al. (WO 96/10053).

Quoting a prior Office action, the Examiner contends that "Huffman et al. discloses a coextruded multiplayer laminate structure used to make a package. The laminate structure has a paper substrate and a multilayer coextrusion including a barrier layer of EVOH, a tie layer, and LDPE (see figure 1) meeting that aspect of claims 19-26."

The Examiner further notes that Huffman et al. "does not specify the exact composition of the EVOH or that the barrier layer is a blend of EVOH and an olefin polymer." To fill in this "gap", the Examiner cites Pearson et al. as disclosing "a barrier layer (page 2, line 28) made from a blend of PE and EVOH that meets the blend

requirements of claims 19 and 26 (page 4, lines 16-30), the EVOH composition of claims 22 and 28 (page 11, lines 3-4, and the polyolefin of claims 19-23 and 26-29."

On the basis of the foregoing combination proposed by the Examiner, the Examiner concludes that at the time of the present invention, it would have been obvious to a person of ordinary skill in the art to use the blend barrier layer in Pearson et al. in the multilayer laminate of Huffman et al. and thereby produce Applicant's claimed invention. According to the Examiner, the motivation for doing such would be to utilize the material's (Pearson et al. material) good oxygen barrier properties. Therefore, it would have been obvious to combine Pearson et al. with Huffman et al to obtain the invention as specified in claims 19-23 and 26-29".

> "The factual inquiry whether to combine references must be thorough and searching. It must be based on objective evidence of record. This precedent has been reinforced in myriad decisions, and cannot be dispensed with." *In re Lee*, 61 USPQ2d 1430, 1433 (Fed. Cir. 2002).

> "A determination of obviousness must involve more than indiscriminately combining prior art; a motivation or suggestion to combine must exist." *Micro Chemical Inc. v. Great Plains Chemical Co.*, 41 USPQ2d 1238 (Fed. Cir. 1997) See also _

> "A rejection cannot be predicated on the mere identification ... of individual components of claimed limitations. Rather, particular finding must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed". *Ecolochem Inc. v. Southern California Edison*, 56 USPQ2d 1065,1076 (Fed Cir 2000)

In the present application, Applicant claims a laminate useful in forming inexpensive containers for products which need or require protection from oxygen migration into the closed container. Claim 19 has been amended to specify that the EVOH/polyolefin blend of the present invention is formed **in the absence of a compatibilizer and that the blend layer exhibits an OTR of less than 1 cc·mil/100 in²·day.** Claims 20-25 are dependent from Claim 19 and therefore inherent each of the elements of amended Claim 19.

Applicant's claimed laminate exhibits the unique characteristic of dramatic enhancement of the oxygen transmission rate (OTR) through the container

wall (the laminate) within a specific range of EVOH/polyolefin blends. This range is more than a matter of degree. Rather, it represents the inventor's discovery that the functionality of the blend in the the claimed laminate is a function of the morphology of the blend. This, in turn, results in unexpectedly small OTRs of the laminate. Specifically, the present inventor has discovered that within the range of 65% - 5% LDPE in a blend of EVOH and LDPE, and in the absence of a compatibilizer, the blend exhibits OTRs of less than about 1cc·mil/100 in^2·day .

Whereas, as the Examiner states, Huffman et al. disclose a coextruded multilayer laminate used to make a package. This aspect of Claim 19 is not deemed to be a novel feature of the claimed invention. However, the Examiner uses such as a first step in dissecting Claim 19 into individual elements, following which, without regard for the structural and/or functionality of the critical element of the claimed invention, the Examiner proceeds to select such individual elements one by one from the prior art without the requisite teaching, disclosure or suggestion in the prior for the Examiner's combination of such individual selections.

More specifically, Huffman et al. disclose a laminate useful in a container for liquids, such as orange juice, etc., where there is desirably an effective oxygen barrier defined within the laminate. Huffman et al. provide this desired oxygen barrier by means of a five-layer coextrusion onto a LDPE-coated surface of a paperboard substrate.

Huffman et al. teach that the five-layer coextrusion is to comprise (a) a layer of LDPE, (b) a tie layer), (c) a layer of EVOH, (d) a tie layer, and (e) a layer of LDPE, in that order. Huffman et al. further teach that this coextrusion is to be "symmetrical" in that the EVOH layer is central to the coextrusion (which means that the EVOH layer is integral within itself). According to Huffman et al., this central EVOH layer is separate to the extent that it will not bond directly to LDPE, hence the necessity of a tie layer between the EVOH layer and each of the LDPE layers present on the opposite surfaces of the EVOH layer. Thus, Huffman et al. teach that the EVOH layer is to be isolated from the LDPE layers in the sense that there is no blending of the EVOH and the LDPE layers. There is no suggestion in Huffman et al.

that there should or could be a blending of the EVOH and a polyolefin, nor if such were to take place, such blend would or could be useful in their laminate. Thus, the Examiner takes the second step of selecting from the prior art an element for incorporation into the Huffman et al. laminate for which there is no basis given for such combination.

Rather, the teaching of Huffman et al. is clearly in a direction away from the inclusion in the Huffman et al. laminate of a "blended layer of LDPE and EVOH" as disclosed by Pearson et al. In this respect, it is noted that the Examiner states that the motivation to make this substitution would be to utilize the "good oxygen barrier properties" of the Pearson et al. blended layer of EVOH and a polyolefin.

It appears to escape the Examiner's attention that the "good oxygen barrier properties" of the Huffman et al. symmetrical sandwich of LDPE/tie layer/EVOH/tie layer/LDPE clearly provides a more effective oxygen barrier layer than would the Pearson et al. coextrusion of LDPE/tie layer/Blend of EVOH and a polyolefin/tie layer/LDPE for the reason that the blend disclosed by Pearson et al. includes less than 100% EVOH (11.8 to 20% EVOH in the Pearson et al. examples). The EVOH in each of Huffman et al. and Pearson et al. is the more effective oxygen barrier material in either of these combinations. Thus, contrary to the Examiner's contention, in addition to the fact that there is no suggestion in Huffman et al.that one should or could substitute a blend of EVOH/polyolefin into the Huffman et al. laminate, there would be no "good oxygen barrier properties" advantage to the inclusion in the Huffman laminate of a blend of EVOH and a polyolefin.

For the foregoing reasons alone, it is respectfully submitted that, the Huffman patent fails as a primary reference for any combination of a EVOH/LDPE blend layer within the Huffman et al. laminate.

In the Examiner's proposed substitution of the blend layer of Pearson et al. for the sandwich layer of the Huffman et al. laminate to thereby produce Applicant's claimed invention, the Examiner fails to recognize that such combination fails to produce the invention claimed by Applicant in amended Claim 19.

Specifically, the morphology of a blend of EVOH and an olefin as taught by Pearson et al. is dramatically distinct in structure and functionality from a sandwich of layers of EVOH and the same olefins as taught by Huffman et al. More specifically, varying the percentages of EVOH and the olefin in a blend thereof imparts different morphologies to the blend due to the unique contribution of each of the EVOH and the polyolefin to the blend. Pearson et al. discuss such morphology changes and conclude that "It is preferable that the concentration of the olefin polymer not be less than 60% by weight and more preferable that the concentration not be less than 90% by weight, based on the total weight of olefin polymer and ethylene-vinyl alcohol copolymer in the laminar article." Thus, Pearson et al. teach that their blends be within the range of 60% - 90% EVOH and 40% and 10% polyolefin. Within these ranges, the blend takes on the morphology of, and behaves like, EVOH in terms of sealability (poor), adhesion (poor to polyethylene), and oxygen barrier (2-3 cc·mil/100 in^2·day when blended with a compatibilizer). Notably,Pearson et al. teaches that even within these ranges of the blend ingredients, there must be added to the blend a compatibilizer if one is to obtain "good" oxygen barrier properties from the blend, "good" being selected as less than 5 cc·mil/100 in^2·day (5 cc·cm/m^2·day). Such "good" OTR is achievable by the Pearson et al. disclosure by including in the blend a compatibilizer. This fact is shown from Table 1 and Figure 1 of Pearson et al. wherein only Example G even approached a "good" OTR, and this Example only showed an OTR of about 2 or 3. Thus, again, the substitution of a blend layer as disclosed by Pearson et al. into the laminate of Huffman et al. would fail to achieve an "excellent" OTR of less than 1 cc·mil/100 in^2·day which is of the essence of Applicant's claimed invention and which closely approaches the OTR of a layer of EVOH alone.

As is well known in the art, a layer of EVOH in a laminate including a paperboard substrate can serve as an oxygen barrier, hence Huffman et al teaches the use of a layer of EVOH isolated between layers of LDPE, the LDPE which is also known to be an oxygen barrier when disposed as a layer in a laminate. According to Huffman et al., this symmetrical sandwich provides "good" oxygen barrier properties to the laminate. Cost of the EVOH is not a factor in the Huffman et al. disclosure.

Rather, the teaching of Huffman et al. is toward sealability of a container formed from their laminate and barrier protection against oxygen. To the contrary, Pearson et al. is directed in major part to the cost of EVOH, hence the use of a blend of EVOH and a less costly polyolefin to define an oxygen barrier in a laminate useful in forming containers. This difference in perspective between Huffman et al. and Pearson et al. in their choice of the construction materials for their respective oxygen barrier layers. As a result, Pearson et al. "settle" for OTRs for their laminate which are higher (less desirable) than the OTR for EVOH alone. Whereas Pearson et al. disclose one example where the OTR of their laminate is less than 2 or 3, such OTR was attained only when the quantity of EVOH was increased and was blended with a compatibilizer. Even then, the laminate of Pearson et al. was less effective as an oxygen barrier than a separate layer of EVOH in the sandwich disclosed by Huffman, thereby mitigating against any substitution of the Pearson et al. blend layer into the laminate of Huffman et al.

Claims 19-23 and 26-29 have been amended to recite that the claimed blend is compounded without a compatibilizer. As defined by Pearson et al., a "compatibilizer" "means a polymer that serves to adhere adjacent layers of olefin polymer and ethylene-vinyl alcohol copolymer to one another". Whereas Pearson et at. state at page 2, line 9 (WO 96/10053) that "If desired, a compatibilizer may also be included in the blend", it is of major importance to note that as shown in Table I and in Figure 1, ONLY Example G WHICH INCLUDED A COMPATIBILIZER produced a blend which exhibited an OTR of less than about 20 cc·mil/100 in^2·day. Example F, which also included a compatibilizer, but half as much EVOH as in Example G, exhibited a greater OTR than Examples B-E. This data shows that (1) the presence of a compatibilizer is essential in the Pearson et al. laminate if one is to obtain a suitable OTR, and (2) an EVOH/polyolefin blend which includes less than 20% EVOH and no compatibilizer produces only a unremarkable OTR. Contariwise, the present inventor has found that a blend containing 35% to 95% EVOH WITHOUT A COMPATIBILIZER produces an excellent OTR of less than about 1 cc·mil/100 in^2·day - a most dramatic and unexpected improvement in OTR.

The discovery by the present inventor of the dramatic enhancement of the OTR provided by a blend layer of EVOH and a polyolefin is not just a matter of selecting a specific range of EVOH/polyolefin content. Rather, the present inventor has found that in the absence of a compatibilizer in the claimed EVOH/polyolefin blend layer of the laminate, the blend is structurally altered such that the morphology of the blend results in interfacial regions between the two phases of the EVOH and the polyolefin with resultant formation of void areas which appear to be large enough to allow small molecules such as oxygen or water to fill such voids, thereby preventing the passage of further oxygen or water molecules through the thickness of the blend layer.

In view of the above, it is respectfully requested that the rejection of Claims 19-23 and 26-29 as being obvious under 35 USC §103 over Huffman, in view of Pearson et al.

Claims 20-23 are dependent on amended Claim 19 and Claims 27-29 are dependent, either directly or indirectly, on amended Claim 26. As such these dependent Claims inherit of the limitations of their respective parent Claim so that their allowance is urged for the same reasons as set forth hereinabove, among others, in discussing their respective parent Claims.

Claims 24 and 30 stand rejected under 35 USC §103(a) as being unpatentable over Huffman et al. in view of Pearson et al. as applied to Claims 29-23 and 26-29 above, and further in view of either Bradfute et al. or Rosenbaum et al.

Claim 24 is indirectly dependent on amended Claim 1 and Claim 30 is directly dependent on Claim 26. In view of the amendments made herein to Claims 1 and 26, and the discussion hereinabove relative to the combination of Pearson et al. with Huffman et al. in connection with amended Claims 1 and 26, it is respectfully submitted that this combination of references fails to render obvious the parent Claims of Claims 24 and 30 irrespective of Bradfute et al. and/or Rosenbaum et al., hence allowance of Claims 24 and 30 is urged for the same reasons, among others, as set forth hereinabove in discussing amended Claims 1 and 26.

Claims 19-22 and 26-28 stand rejected under 35 USC §103(a) as being unpatentable over Huffman et al. in view of the combined teaching of Svensson and Harita et al.

Claims 19-22 and 26-28 stand rejected under 35 USC§103(a) as being unpatentable over Huffman et al. in view of the combined teachings of Svensson and Harita et al.

Huffmann et al. is stated to disclose a laminate for use in the formation of containers and includes, among other things, a layer of EVOH internally of the laminate as an oxygen barrier layer. In the Huffman et al laminate, the EVOH layer is covered on that side thereof which is exposed to the contents of the container with a layer of LDPE.

Svensson et al. disclose a laminate specifically designed to act an a effective oxygen barrier and to preserve the polar flavor and odour ingredients, e.g. fruit alcohols which occur in citrus fruit juices and other fruit juices and which, thus, tend to migrate into and be ingested by the barrier layer at the same time as the packaged juice loses its flavour to a corresponding degree. Svensson discloses that polyethylene because of its non-polar nature, at least to some degree absorbs, ingests and retains flavour or odour ingredients of a more or less non-polar nature of the type occurring in juice products, hence is not desirable as the innermost layer of a container laminate. Svensson et al. give the example that if a PE inner layer is used, d-limonene gradually fades in packaged orange juice product and, in time, becomes so low that a manifest deterioration occurs in the flavour of the packaged product. On the other hand, an innermost layer of EVOH in a container in contact with the packaged product has but slight barrier properties vis-s-vis polar flavour and odour ingredients, e.g. fruit alcohols which occur in citrus fruit juices and other fruit juices and which, thus, tend to migrate into and be ingested into the EVOH barrier layer at the same time as the packaged juice loses its flavour to a corresponding degree. Svensson et al. teaches that the use of a layer consisting of a mixture of polyethylene and ethylene vinyl alcohol be employed as a type of compromise food contact layer of the container. Hence, the two

embodiments of the Svensson et al. laminates provide that the layer of mixed polyethylene and EVOH is fully exposed to the contents of the container. This teaching is foreign to the disclosure of Huffman et al.

Thus, it is respectfully submitted that to substitute the layer of mixed PE and EVOH of Svensson for the layer of EVOH of Huffman et al. would be grossly contrary to the teaching of Huffman et al. so that there is neither reason nor suggestion nor motivation found in Huffman et al. that there would be some advantage in the OTR of the Huffman et al. laminate by the substitution suggested by the Examiner. In fact, not only does Huffman et al. teach away from such substitution, Svensson et al. also teach away from such a substitution since Huffman et al. teaches the use of an LDPE layer as the innermost layer of the container laminate, a situation which Svensson et al. decry as undesirable.

More importantly, neither Huffman et al. nor Svensson et al. teach, disclose nor suggest Applicant's claimed feature of formulation of a blend layer of PE and EVOH in the absence of a compatibilizer such that the blend layer more effectively serves as a barrier to the transmission of oxygen through the container laminate. Still further, there is no suggestion in either Huffman et al, nor in Svensson et al., either alone or in the combination suggested by the Examiner, that the blend layer claimed by Applicant would or could produce a laminate layer which exhibits an OTR of less than one cc-mil/100 $in^2 \cdot$ day as set forth in amended Claim 19 and 26, and which limitations carry forward to their dependent Claims 20-22 and 27 and 28, respectively.

Harita et al. is cited as disclosing the ethylene content of Applicant's claimed blend of PE and EVH as set forth in Claims 22 and 28. Harita et al. relates to a blend of PE and a saponified product of EVA and the ethylene content range cited by Harita et al. refers to the ethylene content in the EVA. Applicant's ethylene content range refers to EVOH. Applicant is without sufficient information to understand the motivation for selecting a range of ethylene in EVA into either Huffman et at. or Svensson, and especially into a combination of Huffman et al. and Svensson et al.

Irrespective of the foregoing, Harita et al. adds nothing to Svensson et al. which would render Svensson et al. compatible with Huffman et al. as set forth hereinabove, and further, Harita et al. neither teaches, discloses nor suggests that the blend of Harita et al., alone on in combination with Svensson et al. could or would produce a PE/EVOH blend layer in a laminate which, in the absence of a compatilizer, would provide an OTR of less than one cc·mil/100 in^2 · day as claimed by Applicant.

For the reasons set forth hereinabove in discussing the allowability of amended Claim 19 and 26, and their dependent Claims, and the immediately preceding discussion of Svensson et al. and Harita et al., it is submitted that Claims 19-22 and 15-28 are patentable under 35 USC §103(a) over the Examiner's proposed combination of Huffman et al., Svensson et al. and Hatita et al. Withdrawal of this basis of rejection of these Claims is respectfully requested.

As a collateral issue, the Examiner contends that the motivation for combining Harita et al. with Svensson et al., and then combining this combination with Huffman et al lies in a desire to "utilize the barrier properties of the blend barrier layer". Which "blend barrier layer" is being referenced is unclear, but is assumed to be a blend barrier layer which includes the blend of Svensson et al. as modified by the EVA ethylene range attributed to Harita et al. In this respect, it is again noted that the Svensson et al. mixture layer includes a layer of PE/EVOH on the inner surface of the container in contact with the contents of the container and therefore is not compatible with the Huffman et al. laminate wherein the laminate layer in contact with the contents of the container is LDPE. As taught by Svensson et al. these two layers are functionally different and therefore not interchangeable as suggested by the Examiner. Accordingly, the "motivation" suggested by the Examiner does not exist. And, even should there be effected the Examiner's proposed substitution, the resulting laminate still would not meet the limitations of amended Claim 19 and 26, and their respective dependent Claims with respect to the advantage of blending PE with EVOH in the absence of a compatibilizer to obtain the dramatically low OTR of Applicant's claimed laminate.

Claims 23, 25, 29 and 34 stand rejected under 35 USC §103(a) as being unpatentable over Huffman et al. in view of the combined teachings of Svensson and Harita et al. as applied to Claims 19-22 and 26, 28, and further in view of Charrier.

Charrier is stated by the Examiner as teaching that the term PE includes LDPE.

Claims 23, 25 and 34 are dependent from Claim 19 and Claim 29 is dependent from Claim 26. Each of Claims 19 and 26 have been amended to recite that in Applicant's claimed invention the PE/EVOH blend is formed in the absence of a compatibilizer and that the blend exhibits an OTR of less than 1 cc·mil/100 in^2 · day. Thus, Claims 2, 3 25, 29 and 34 inherit the limitations of their respective patent Claims and their allowance is urged for the same reasons, among others, as set forth hereinabove in discussing the allowability of their parent Claims.

Claims 24 and 30 stand rejected under 35 USC §103(a) as being unpatentable over Huffman et al. in view of the combined teachings of Svensson and Harita et al. as applied to Claims 19 and 26, and further in view of either Bradfute et al. or Rosenbaum et al. Bradfute et al. and Rosenbaum et al. are both cited as teaching that PE is a known adhesive tie layer.

Claim 24 is dependent from amended Claim 19. Claim 30 is dependent from amended Claim 26. Each of Claims 19 and 26 have been amended to recite that in Applicant's claimed invention the PE/EVOH blend is formed in the absence of a compatibilizer and that the blend exhibits an OTR of less than 1 cc·mil/100 in^2 · day. Thus, Claims 24 and 30 inherit the limitations of their respective patent Claims and their allowance is urged for the same reasons, among others, as set forth hereinabove in discussing the allowability of their parent Claims.

Reconsideration of the present application and allowance of Claims 19-31, as amended, are respectfully requested.

Respectfully submitted,

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